WHAT WE CLAIM IS:

1. A system of lifting and conveying a concrete slab and any associated works, wherein the slab has a plurality of apertures therethrough the slab area, the said apertures being provided with a respective jack, said jack at least comprising at least one shaft having a portion passing through said aperture and contacting a lower support means, means for connecting said slab to said shaft, the connection means incorporating at least one supporting member connecting the slab to the shaft, each supporting member passing through a another said aperture and engaging said slab, and a means for effecting longitudinal travel of said supporting means along said shaft, otherwise resulting in the raising or lowering of said slab, position sensors associated with each jack, means for communicating between each jack and one or more main controllers, and means for controlling each jack whereby the jacks are movable in a synchronised manner.

2. A system as claimed in claim 1 wherein the jack includes trailing restraint means being adapted to provide restraint and or stability for the jack once it has climbed or the jack has been disconnected from the slab.

3. A system as claimed in claim 2 wherein each aperture therein containing the supporting member is provided in co-operation with the position of the shaft, and henceforth the aperture through which it passes.

4. A system as claimed in claim 3 wherein said lower supporting means includes a supporting strut supporting the shaft from the floor below.

5. A system as claimed in claim 4 wherein said lower supporting means includes a back prop supporting the floor below the strut.

6. A system as claimed in claim 5 wherein each aperture therein containing said shaft is proportionally larger in diameter than said aperture therein containing said supporting member.

7. A system as claimed in claim 6 wherein each supporting member engages with the downwardly facing or upper face of the slab.

8. A system as claimed in claim 7 wherein each jack has pivoting means such that in use each jack can accommodate displacement of the jack whereby there is a minimum transfer of moment through any tensile members.

9. A system as claimed in claim 8 wherein each shaft comprises a pair of columns on either side of a ball screw, the ball screw being supported by a spherical roller bearing mounted in a top plate, thus bridging the columns.

10. A system as claimed in claim 9 wherein the supporting member/s are steel rods adapted to connect said hanger assembly to the slab.

11. A system as claimed in claim 10 wherein the supporting member/s are provided with a respective sleeve.

12. A system as claimed in claim 11 wherein the connection means comprises a hanger assembly in co-operation with at least one supporting member.

13. A system as claimed in claim 12 wherein the supporting member/s are provided with bearing plates on the underside of the slab, and connected by corresponding bearing plates and fasteners to the hanger assembly.

14. A system as claimed in claim 13 wherein the hanger assembly is supported for movement along said shaft, and more preferably the hanger assembly is pivotally supported at a point of rotation at some point along the central axis of the ball screw.

15. A system as claimed in claim 14 wherein during climbing, the ball screw will turn downwards in the opposite direction from when it is lifting the slab.

16. A system as claimed in claim 15 wherein during climbing the hanger acts in compression and during lifting of each slab, the hanger is in tension.

17. A system as claimed in claim 16 wherein during climbing the ball screw acts in tension while during lifting the ball screw acts in compression.

18. A system as claimed in claim 17 wherein the means for communicating between each jack includes a wire and wireless means.

19. A system as claimed in claim 18 wherein a micro processor or computer or PLC or in combination, is connected via an electric motor to each jack such that synchronised position control is achieved for all the jacks.

20. A system as claimed in claim 19 wherein each jack includes a screw jack driven by the electric or hydraulic motor which is controlled by a variable speed drive.

21. A system as claimed in claim 20 wherein the system includes a scaffolding means, said scaffolding means adapted to associate with and accompany the concrete slab, wherein said scaffolding means comprises a platform, said platform adapted to engage with a shaft, said platform adapted to allow a number of persons to stand thereon; said shaft therein passing through a guiding means, said guiding means connected to a material to be lifted; a connection means therein adapted to connect the shaft with the material to be lifted.

22. A system substantially as herein described with reference to the accompanying drawings.

23. A method of lifting a concrete slab and associated works, wherein there is provided a concrete slab having an area having a plurality of apertures therethrough, a number of said apertures provided with a respective jack, said jack at least comprising at least one

shaft having a portion passing through said aperture and contacting a lower support means, means for connecting said slab to said shaft, the connection means incorporating at least one supporting member connecting the slab to the shaft, each supporting member passing through another said aperture and engaging said slab, and a means for effecting longitudinal travel of said supporting means along said shaft, otherwise resulting in the raising or lowering of said slab, position sensors associated with each jack, means for communicating between each jack and one or more main controllers, and means for controlling each jack wherein the method includes the following steps of:

connecting at least one jack to a slab;
connecting communication means to at least one jack;
connecting at least one controller to the jack via the communication means;
activating the control means whereby each jack is preloaded followed by
further activating the control means to each jack in a co-ordinated or synchronised manner whereby the slab is raised/lowered by a specific amount.

24. A system substantially as herein described with reference to the accompanying drawings.

25. A jack for lifting a concrete slab, the jack including : at least one shaft and ball screw, a drive assembly, a hanger assembly, a support device wherein the drive assembly drives the ball screw to raise the shaft with respect to the hanger assembly such that the jack has climbed, the support device supports the shaft to prevent toppling and provide stability.

26. A jack as claimed in claim 25 wherein the drive assembly further drives the ball screw to raise the hanger assembly with respect to the shaft such that in use the jack has lifted a slab.

27. A jack as claimed in claim 26 wherein the support device includes a trailing restraint member being arranged with the shaft whereby the trailing restraint member is removably located and connected with the shaft such that in use it can be fully extended from the shaft when the jack has climbed.

28. A jack as claimed in claim 27 wherein a strut member is linked to the shaft such that when the jack is climbed, the strut can be raised with the jack to the next floor, to provide support for the jack to the floor below the jack.

29. A jack as claimed in claim 28 wherein the strut is provided with a removable foot member, to redistribute any strut loading through the slab in the floor below the jack.

30. A jack as claimed in claim 29 wherein the jack includes a controller located at one end of the shaft whereby the position of the hanger can be precisely controlled.

31. A jack as claimed in claim 30 wherein the jack does not include a controller.

32. A jack as claimed in claim 31 wherein the controller is a micro processor or PLC or computer.

33. A jack as claimed in claim 32 wherein each jack has pivoting means such that in use each jack can accommodate displacement of the jack whereby there is a minimum transfer of moment.

34. A jack as claimed in claim 33 wherein a back prop can be used to support the floor directly below the strut such that at least two floors below each jack, can be used to provide support.

35. A jack as claimed in claim 34 wherein the back prop is provided with a removable foot member, to redistribute any prop loading through the slab in the floor below the strut.

36. A jack substantially as herein described with reference to the accompanying drawings.

37. A method of lifting a concrete slab using at least one jack, each jack including: a shaft and ball screw, a drive assembly, a hanger assembly, a support device wherein the drive assembly drives the ball screw to raise the hanger assembly with respect to the shaft such that in use the jack has lifted a slab and raise the shaft to self climb the jack, the support device supports the shaft to prevent toppling and provide stability wherein the steps include:

a) install boxing for first slab on base;

b) pour first slab;

c) install jack

d) preload jack and then lift first slab with boxing for second slab on top with hangers being in tension;

e) pour second slab on top of first slab followed by putting ground floor walls/column supports. Supports can be placed before pouring second slab or afterwards;

f) attach strut(s) to base of jack on ground or base slab with foot;

g) climb jack up to next level (first floor) without moving any slabs leaving strut in place from ground to jack (hangers in compression while ball screw in tension); trailing restraint automatically slidably drops down from inside each jack to extend to floor directly below whereby the jack is laterally supported preventing instability;

h) once ground floor columns cured, release hanger from first slab to be under second slab ;restablish hangers and preload and then lift the second slab to second floor position;

i) pour third slab; fit support columns to first floor under second slab before or after this pour; strut still in place with trailing restraint;

j) climb jack and struts; position back prop;

k) finish climbing each jack until strut foot inerted and back prop foot also inserted; strut and back prop are fully extended; trailing restraint automatically follows;

l) prelift and then lift third slab;

m) supports put in and pour fourth slab and climb/raise jack and strut and back prop whereby back prop is in the first floor;

wherein these steps are repeated whereby pouring slabs, prelifting, lifting, and climbing by the jacks with boxing and supports being provided where necessary such that the jack is laterally supported during climbing.

36. A method as claimed in claim 35 substantially as herein described with reference to the accompanying drawings.

37. A method of lifting a concrete slab using at least one jack, each jack including: a shaft and ball screw, a drive assembly, a hanger assembly, a support device wherein the drive assembly drives the ball screw to raise the hanger assembly with respect to the shaft such that in use when the jack has climbed to raise a slab, the support device supports the shaft to prevent toppling and provide stability wherein the steps include:

-forming boxing for slab;
-pouring concrete in boxing;
-prelifting and then lifting each jack in coordinated amounts;
-providing support to slab;
-climbing each jack while the restraint member moves into place.

38. A method as claimed in claim 37 wherein a strut is provided to support the jack.

39. A method as claimed in claim 38 wherein a back prop is provided to support the strut.

40. A method as claimed in claim 37 substantially as herein described with reference to the accompanying drawings.